

NOTICE OF REVISION (NOR) This revision described below has been authorized for the document listed.			1. DATE (YYMMDD) <div style="text-align: center;">93-12-01</div>		Form Approved OMB No. 0704-0188		
Public reporting burden for this collection is estimated to average 2 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503. PLEASE DO NOT RETURN YOUR COMPLETED FORM TO EITHER OF THESE ADDRESSED. RETURN COMPLETED FORM TO THE GOVERNMENT ISSUING CONTRACTING OFFICER FOR THE CONTRACT/ PROCURING ACTIVITY NUMBER LISTED IN ITEM 2 OF THIS FORM.					2. PROCURING ACTIVITY NO.		
					3. DODAAC		
4. ORIGINATOR		b. ADDRESS (Street, City, State, Zip Code) Defense Electronics Supply Center 1507 Wilmington Pike Dayton, OH 45444-5270		5. CAGE CODE <div style="text-align: center;">67268</div>		6. NOR NO. <div style="text-align: center;">5962-R049-94</div>	
a. TYPED NAME (First, Middle Initial, Last)				7. CAGE CODE <div style="text-align: center;">67268</div>		8. DOCUMENT NO. <div style="text-align: center;">85152</div>	
9. TITLE OF DOCUMENT MICROCIRCUITS, MEMORY, DIGITAL, NMOS, 256K x 1 RAM MONOLITHIC SILICON				10. REVISION LETTER		11. ECP NO.	
				<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;">a. CURRENT</td> <td style="width: 50%; border: none;">b. NEW</td> </tr> <tr> <td style="text-align: center; border: none;">D</td> <td style="text-align: center; border: none;">E</td> </tr> </table>			
a. CURRENT	b. NEW						
D	E						
12. CONFIGURATION ITEM (OR SYSTEM) TO WHICH ECP APPLIES <div style="text-align: center;">All</div>							
13. DESCRIPTION OF REVISION <div style="margin-left: 40px;"> Sheet 1: Revisions ltr column; add "E". Revisions description column; add "Changes in accordance with NOR 5962-R049-94". Revisions date column; add "93-12-01". Revision level block; add "E". Rev status of sheets; For sheets 15 and 28 add "E". </div> <div style="margin-left: 40px; margin-top: 20px;"> Sheet 15: Footnote number 19: Change from Must be a dimensional difference of .020 inch (0.51 mm) between L1 and L2. To read as follows: Must be a dimensional difference of .010 inch (0.25 mm) between L1 and L2. Revision level Block; add "E" </div> <div style="margin-left: 40px; margin-top: 20px;"> Sheet 28: Figure 6: Change from " $C_L = pF \pm 20\%$ " To $C_L = 80 pF$ and delete the $\pm 20\%$ Revision level Block; add "E" </div>							
14. THIS SECTION FOR GOVERNMENT USE ONLY							
a. (X one)		X	(1) Existing document supplemented by the NOR may be used in manufacture.				
			(2) Revised document must be received before manufacturer may incorporate this change.				
			(3) Custodian of master document shall make above revision and furnish revised document.				
b. ACTIVITY AUTHORIZED TO APPROVE CHANGE FOR GOVERNMENT DESC-EC				c. TYPED NAME (First, Middle Initial, Last) Michael A. Frye			
d. TITLE Chief, Microelectronics Branch		e. SIGNATURE Michael A. Frye			f. DATE SIGNED (YYMMDD) 93-12-01		
15a. ACTIVITY ACCOMPLISHING REVISION DESC-EC		b. REVISION COMPLETED (Signature) James E. Jamison			c. DATE SIGNED (YYMMDD) 93-12-01		

REVISIONS																			
LTR	DESCRIPTION										DATE (YR-MO-DA)					APPROVED			
A	Convert to military drawing format. Add LCC package type. Add one device type. Change replacement military specification number. Add two vendors.										87-05-05					M. A. Frye			
B	Add vendor CAGE number 6Y440 as a supplier of device type 03. Changes to table I and table I footnotes. Changes to figure 1, figure 3, and figure 5. Editorial changes throughout.										88-10-04					M. A. Frye			
C	Delete vendor CAGE 01295 as a source of supply for X package. Add the Y package for vendor CAGE 01295. Editorial changes throughout.										90-11-06					M. A. Frye			
D	Changes to figure 1, case outline Y, dimensions for symbols L1 and L2. Editorial changes throughout.										92-07-27					M. A. Frye			

CURRENT CAGE CODE 67268

REV																												
SHEET																												
REV	D	C	C	C	C	C	C	C	C	C	C	C	C	C	C	D												
SHEET	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29												
REV STATUS OF SHEETS				REV			D	D	D	C	B	B	B	B	C	C	C	C	C									
				SHEET			1	2	3	4	5	6	7	8	9	10	11	12	13									
PMIC N/A				PREPARED BY James E. Jamison							DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444																	
STANDARDIZED MILITARY DRAWING THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE AMSC N/A				CHECKED BY Wm. J. Johnson																								
				APPROVED BY Michael A. Frye																								
				DRAWING APPROVAL DATE 86-01-02																								
				REVISION LEVEL D																								
				SIZE A		CAGE CODE 14933			85152																			
				SHEET		1		OF		29																		

1. SCOPE

1.1 Scope. This drawing describes device requirements for class B microcircuits in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices".

1.2 Part or Identifying Number (PIN). The complete PIN shall be as shown in the following example:

<u>85152</u>	<u>01</u>	<u>E</u>	<u>X</u>
Drawing number	Device type (1.2.1)	Case outline (1.2.2)	Lead finish per MIL-M-38510

1.2.1 Device type(s). The device type(s) shall identify the circuit function as follows:

Device type	Generic number	1/	Circuit	Access time	Refresh
01			256K x 1 DRAM	150 ns	256 cycles (4 ms)
02			256K x 1 DRAM	200 ns	256 cycles (4 ms)
03			256K x 1 DRAM	120 ns	256 cycles (4 ms)

1.2.2 Case outline(s). The case outline(s) shall be as designated in appendix C of MIL-M-38510, and as follows:

Outline letter	Case outline
E	D-2 (16-lead, .840" x .310" x .200"), dual-in-line package
X	See figure 1 (18-terminal, .305" x .505"), rectangular chip carrier package
Y	See figure 1 (18-terminal, .305" x .505"), rectangular chip carrier package

1.3 Absolute maximum ratings. 2/

Voltage range for any pin, including V_{CC} supply	3/ - -	-1.0 V dc to +7.0 V dc
Short circuit output current	- - - - -	50 mA
Power dissipation	- - - - -	1 W
Storage temperature range	- - - - -	-65°C to +150°C
Lead temperature (soldering, 10 seconds)	- - - - -	+300°C
Thermal resistance, junction-to-case (θ_{JC}):		
Cases X and Y	- - - - -	50°C/W
Case E	- - - - -	See MIL-M-38510, appendix C

1.4 Recommended operating conditions.

Supply voltage range (V_{CC})	- - - - -	4.75 V dc to 5.25 V dc
Supply voltage (V_{SS})	- - - - -	0 V dc
High level input voltage range (V_{IH})	- - - - -	2.4 V dc to 5.0 V dc
Low level input voltage range (V_{IL})	- - - - -	-0.5 V dc to +0.6 V dc
Case operating temperature range (T_C)	- - - - -	-55°C to +110°C
Refresh cycle time	- - - - -	4.0 ms

1/ Generic numbers are listed on the Standardized Military Source Approval Bulletin and will be listed in MIL-BUL-103.

2/ Voltage values are with respect to V_{SS} .

3/ Exposure to absolute maximum rated conditions for extended periods may affect device reliability.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

85152

REVISION LEVEL
D

SHEET
2

2. APPLICABLE DOCUMENTS

2.1 Government specification, standard, and bulletin. Unless otherwise specified, the following specification, standard, and bulletin of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

SPECIFICATION

MILITARY

MIL-M-38510 - Microcircuits, General Specification for.

STANDARD

MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.

BULLETIN

MILITARY

MIL-BUL-103 - List of Standardized Military Drawings (SMD's).

(Copies of the specification, standard, and bulletin required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take precedence.

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices" and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.

3.2.1 Case outlines. The case outlines shall be in accordance with 1.2.2 herein.

3.2.2 Terminal connections. The terminal connections shall be as specified on figure 2.

3.2.3 Logic diagram. The logic diagram shall be as specified on figure 3.

3.2.4 Block diagram. The block diagram shall be as specified on figure 4.

3.3 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in table I and shall apply over the full case operating temperature range.

3.4 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table II. The electrical tests for each subgroup are described in table I.

3.5 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the PIN listed in 1.2 herein. In addition, the manufacturer's PIN may also be marked as listed in MIL-BUL-103 (see 6.6 herein).

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		85152
		REVISION LEVEL D	SHEET 3

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions 1/ 2/ -55°C ≤ T _C ≤ +110°C 4.75 V dc ≤ V _{CC} ≤ 5.25 V dc	Group A subgroups	Device type	Limits		Unit
					Min	Max	
High level output voltage	V _{OH}	I _{OH} = -5 mA, V _{CC} = 4.75 V V _{IL} = 0.6 V, V _{IH} = 2.4 V	1,2,3	All	2.4		V
Low level output voltage	V _{OL}	I _{OL} = 4.2 mA, V _{CC} = 4.75 V	1,2,3	All		0.4	V
High level input leakage current	I _{IH}	V _{CC} = 5.25 V, V _I = 5.0 V	1,2,3	All		10	μA
Low level input leakage current	I _{IL}	V _{CC} = 5.25 V, V _I = 0.0 V	1,2,3	All		-10	μA
High level output leakage current	I _{OH}	V _{CC} = 5.25 V V _O = 5.25 V	1,2,3	All		10	μA
Low level output leakage current	I _{OL}	V _{CC} = 5.25 V, V _O = 0.0 V	1,2,3	All		-10	μA
Average operating current during read or write cycle 3/	I _{CC1}	t _c = minimum cycle V _{CC} = 5.25 V	1,2,3	01		75	mA
				02		60	mA
				03		80	mA
Standby current 3/	I _{CC2}	After 1 memory cycle $\overline{\text{RAS}}$ and CAS high V _{CC} = 5.25 V	1,2,3	All		5	mA
Average refresh current 3/	I _{CC3}	t _c = minimum cycle, $\overline{\text{CAS}}$ high, RAS cycling V _{CC} = 5.25 V	1,2,3	01		60	mA
				02		50	mA
				03		63	mA
Average page-mode current 3/	I _{CC4}	t _{c(P)} = minimum cycle, $\overline{\text{RAS}}$ low, $\overline{\text{CAS}}$ cycling V _{CC} = 5.25 V	1,2,3	01,03		50	mA
				02		45	mA
Access time from $\overline{\text{RAS}}$	t _{a(R)}	See figures 5 and 6 V _{CC} = 4.75 V to 5.25 V	9,10,11	01		150	ns
				02		200	ns
				03		120	ns

See footnotes at end of table.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

85152

REVISION LEVEL
D

SHEET
4

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions <u>1/</u> <u>2/</u> -55°C ≤ T _C ≤ +110°C 4.75 V dc ≤ V _{CC} ≤ 5.5 V dc	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Access time from $\overline{\text{CAS}}$	t _{a(C)}	See figures 5 and 6 V _{CC} = 4.75 V to 5.25 V	9,10,11	01		80	ns
				02		100	ns
				03		65	ns
Output disable time after CAS high <u>4/</u>	t _{dis(CH)}		9,10,11	01		30	ns
				02		35	ns
				03		30	ns
Page-mode cycle time <u>4/</u>	t _{c(P)}		9,10,11	01	145		ns
				02	190		ns
				03	125		ns
Page-mode cycle time (read-modify-write cycle <u>4/</u>)	t _{c(PM)}		9,10,11	01	205		ns
				02	250		ns
				03	172		ns
Read cycle time <u>4/</u>	t _{c(rd)}		9,10,11	01	260		ns
				02	330		ns
				03	230		ns
Write cycle time <u>4/</u>	t _{c(W)}		9,10,11	01	260		ns
				02	330		ns
				03	230		ns
Read-write/read-modify- write cycle time <u>4/</u>	t _{c(rdW)}		9,10,11	01	315		ns
				02	390		ns
				03	277		ns
Pulse duration, $\overline{\text{CAS}}$ high (page mode)	t _{w(CH)P}		9,10,11	01	60		ns
				02	80		ns
				03	50		ns

See footnotes at end of table.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

85152

REVISION LEVEL
D

SHEET
5

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ 2/ -55°C ≤ T _C ≤ +110°C 4.75 V dc ≤ V _{CC} ≤ 5.5 V dc	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Pulse duration, $\overline{\text{CAS}}$ high (non-page mode)	t _{w(CH)}	See figures 5 and 6 V _{CC} = 4.75 V to 5.25 V	9,10,11	01	60		ns
				02	80		ns
				03	25		ns
Pulse duration, $\overline{\text{CAS}}$ low 5/	t _{w(CL)}		9,10,11	01	80	10,000	ns
				02	100	10,000	ns
				03	65	10,000	ns
Pulse duration, $\overline{\text{RAS}}$ high (precharge time) (page mode)	t _{w(RH)P}		9,10,11	01,02	120		ns
				03	115		ns
Pulse duration, $\overline{\text{RAS}}$ high (precharge time) (non-page mode)	t _{w(RH)}		9,10,11	01,03	100		ns
				02	120		ns
Pulse duration, $\overline{\text{RAS}}$ low 5/	t _{w(RL)}		9,10,11	01	150	10,000	ns
				02	200	10,000	ns
				03	120	10,000	ns
Write pulse duration	t _{w(W)}		9,10,11	01	45		ns
				02	55		ns
				03	40		ns
Column address setup time	t _{su(CA)}		9,10,11	All	0		ns
Row address setup time	t _{su(RA)}		9,10,11	01,02	5		ns
				03	0		ns
Data setup time	t _{su(D)}		9,10,11	All	3		ns
Read command setup time	t _{su(rd)}		9,10,11	All	5		ns
Early write command setup time before $\overline{\text{CAS}}$ low	t _{su(WCL)}		9,10,11	All	0		ns

See footnotes at end of table.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

85152

REVISION LEVEL
D

SHEET
6

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ 2/ -55°C ≤ T _C ≤ +110°C 4.75 V dc ≤ V _{CC} ≤ 5.5 V dc	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Write <u>command</u> setup time before CAS high	t _{su(WCH)}	See figures 5 and 6 V _{CC} = 4.75 V to 5.25 V	9,10,11	01	45		ns
				02	65		ns
				03	40		ns
Write <u>command</u> setup time before RAS high	t _{su(WRH)}		9,10,11	01	45		ns
				02	65		ns
				03	40		ns
Column <u>address</u> hold time after CAS low	t _{h(CLCA)}		9,10,11	01	30		ns
				02	45		ns
				03	20		ns
Row address hold time	t _{h(RA)}		9,10,11	01	20		ns
				02	25		ns
				03	15		ns
Column <u>address</u> hold time after RAS low	t _{h(RLCA)}		9,10,11	01	100		ns
				02	145		ns
				03	75		ns
Data hold time after $\overline{\text{CAS}}$ low	t _{h(CLD)}		9,10,11	01	50		ns
				02	55		ns
				03	40		ns
Data hold time after $\overline{\text{RAS}}$ low	t _{h(RLD)}		9,10,11	01	120		ns
				02	155		ns
				03	95		ns
Data hold time after $\overline{\text{W}}$ low	t _{h(WLD)}		9,10,11	01	45		ns
				02	55		ns
				03	40		ns

See footnotes at end of table.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

85152

REVISION LEVEL
D

SHEET
7

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ 2/ -55°C ≤ T _C ≤ +110°C 4.75 V dc ≤ V _{CC} ≤ 5.5 V dc	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Read <u>command</u> hold time after CAS high	t _{h(CHrd)}	See figures 5 and 6 V _{CC} = 4.75 V to 5.25 V	9,10,11	All	0		ns
Read <u>command</u> hold time after RAS high	t _{h(RHrd)}		9,10,11	01,03	10		ns
				02	15		ns
Write <u>command</u> hold time after CAS low	t _{h(CLW)}		9,10,11	01	50		ns
				02	55		ns
				03	40		ns
Write command hold time	t _{h(RLW)}		9,10,11	01	120		ns
				02	155		ns
				03	95		ns
Delay time, <u>RAS</u> low to <u>CAS</u> high	t _{RLCH}		9,10,11	01	150		ns
				02	200		ns
				03	120		ns
Delay time, <u>CAS</u> high to <u>RAS</u> low	t _{CHRL}		9,10,11	All	5		ns
Delay time, <u>CAS</u> low to <u>RAS</u> high	t _{CLR_H}		9,10,11	01	80		ns
				02	100		ns
				03	65		ns
Delay time, <u>RAS</u> low to <u>CAS</u> high 7/	t _{RLCH}		9,10,11	01	30		ns
				02	40		ns
				03	30		ns
Delay time, <u>CAS</u> low to <u>RAS</u> low 7/	t _{CLRL}		9,10,11	01	30		ns
				02	35		ns
				03	30		ns

See footnotes at end of table.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

85152

REVISION LEVEL
D

SHEET
8

TABLE I. Electrical performance characteristics - Continued.

Test	Symbol	Conditions 1/ 2/ -55°C ≤ T _C ≤ +110°C 4.75 V dc ≤ V _{CC} ≤ 5.5 V dc	Group A subgroups	Device type	Limits		Unit
					Min	Max	
Delay time, $\overline{\text{CAS}}$ low to $\overline{\text{W}}$ low (read-modify-write cycle only)	t _{CLWL}	See figures 5 and 6 V _{CC} = 4.75 V to 5.25 V	9,10,11	01	85		ns
				02	90		ns
				03	67		ns
Delay time, $\overline{\text{RAS}}$ high to $\overline{\text{CAS}}$ low	t _{RHCL}		9,10,11	All	25		ns
Delay time, $\overline{\text{RAS}}$ low to $\overline{\text{CAS}}$ low	t _{RLCL}		9,10,11	01	25	70	ns
				02	35	100	ns
				02	25	55	ns
Delay time, $\overline{\text{RAS}}$ low to $\overline{\text{W}}$ low (read-modify-write cycle only)	t _{RLWL}		9,10,11	01	155		ns
				02	190		ns
				03	122		ns
Refresh time interval	t _{rf}		9,10,11	All		4.0	ms

1/ Timing measurements are referenced to V_{IL} maximum and V_{IH} minimum.

2/ System transition times (rise and fall) for RAS and CAS are to be a minimum of 3 ns and a maximum of 50 ns.

3/ All I_{CC} measurements are taken with output (Q) open.

4/ All cycle times assume transition times t_t = 5 ns.

5/ In a read-modify-write cycle t_{LWL} and t_{su(WCH)} must be observed. Depending on the user's transition time, this may require additional CAS low time t_{w(EL)}. Applies to page-mode read-modify-write also.

6/ In a read-modify-write cycle, t_{RLWL} and t_{su(WRH)} must be observed. Depending on the user's transition time, this may require additional RAS low time t_{w(RL)}.

7/ CAS before RAS refresh only.

3.6 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in MIL-BUL-103 (see 6.6 herein). The certificate of compliance submitted to DESC-ECS prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.7 Certificate of conformance. A certificate of conformance as required in MIL-STD-883 (see 3.1 herein) shall be provided with each lot of microcircuits delivered to this drawing.

3.8 Notification of change. Notification of change to DESC-ECS shall be required in accordance with MIL-STD-883 (see 3.1 herein).

3.9 Verification and review. DESC, DESC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

85152

REVISION LEVEL
D

SHEET
9

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with section 4 of MIL-M-38510 to the extent specified in MIL-STD-883 (see 3.1 herein).

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following additional criteria shall apply:

a. Burn-in test, method 1015 of MIL-STD-883.

(1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.6 herein).

(2) $T_A = +125^{\circ}\text{C}$, minimum.

b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	1
Final electrical test parameters (method 5004)	1*, 2, 3, 9, 10, 11
Group A test requirements (method 5005)	1, 2, 3, 9, 10, 11
Groups C and D end-point electrical parameters (method 5005)	2, 3, 7, 8a, 8b

* PDA applies to subgroup 1.

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

4.3.1 Group A inspection.

a. Tests shall be as specified in table II herein.

b. Subgroups 4, 5, 6, 7, and 8 in table I, method 5005 of MIL-STD-883 shall be omitted.

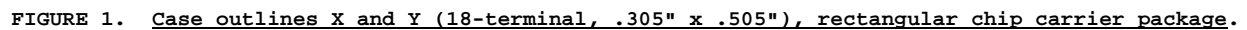
STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

85152

REVISION LEVEL
D

SHEET
10



DESC FORM 193A
JUL 91

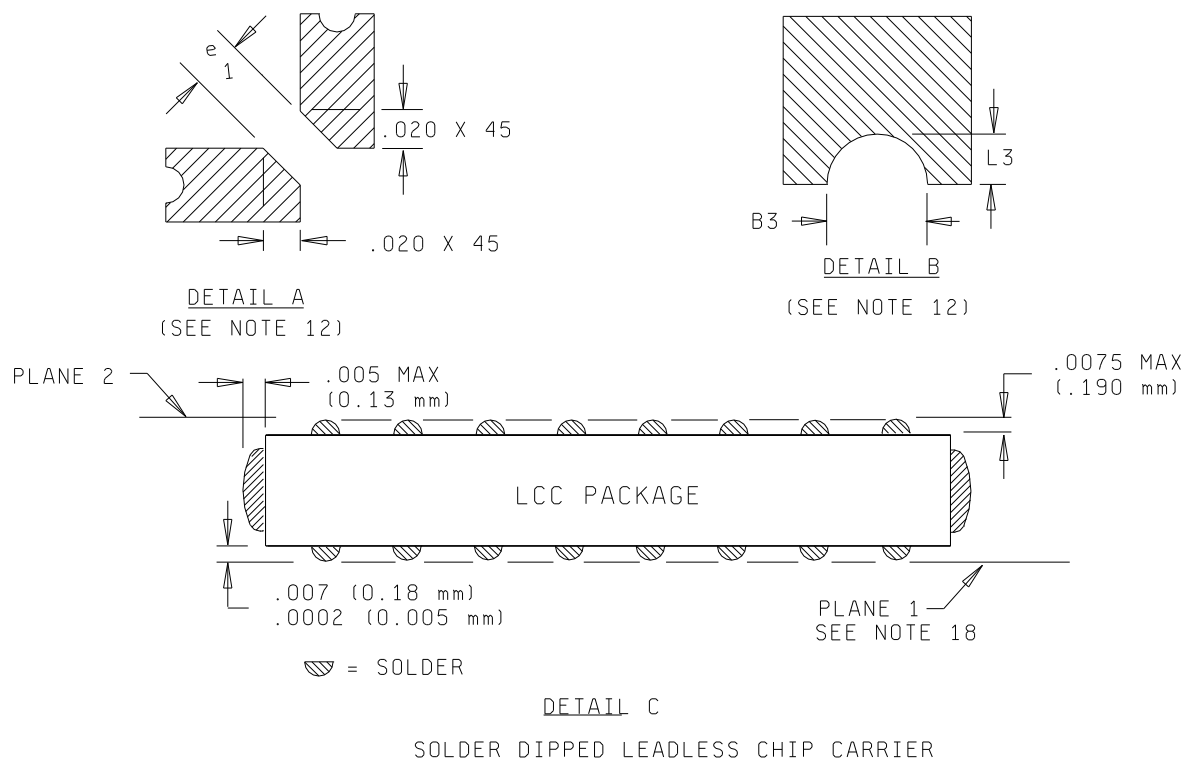


FIGURE 1. Case outlines X and Y (18-terminal, .305" x .505"), rectangular chip carrier package - Continued.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

85152

REVISION LEVEL
D

SHEET
12

Dimensions					
Symbol	Inches		Millimeters		Notes
	Min	Max	Min	Max	
A	.060	.120	1.52	3.04	10, 14
A1	.050	.088	1.27	2.24	
B	---	---	---	---	
B1	.022	.028	0.56	0.71	5, 7
B2	.072 REF		1.83 REF		8, 9
B3	.006	.022	0.15	0.56	12
D	.280	.305	7.11	7.74	
D1	.150 BSC		3.81 BSC		
D2	.075 BSC		1.90 BSC		17
D3	---	.305	---	7.74	5
E	.480	.505	12.19	12.83	
E1	.200 BSC		5.08 BSC		
E2	.100 BSC		2.54 BSC		17
E3	---	.365	---	9.27	5
e	.050 BSC		0.38 BSC		
e1	.015	---	5, 13		5, 13
h	.040 REF		1.02 REF		11
j	.020 REF		0.51 REF		11
L	.045	.055	1.14	1.40	
L1	.045	.055	1.14	1.40	
L2	.075	.095	1.90	2.41	8, 9
L3	.003	.015	0.08	0.38	12
ND	4				6
NE	5				6
N	18				6

FIGURE 1. Case outline X (18-terminal, .305" x .505"), rectangular chip carrier package - Continued.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

85152

REVISION LEVEL
D

SHEET
13

Dimensions					
Symbol	Inches		Millimeters		Notes
	Min	Max	Min	Max	
A	.060	.120	1.52	3.04	10, 14
A1	.050	.088	1.27	2.24	
B	---	---	---	---	
B1	.020	.030	0.50	0.76	5, 7
B2	.072 REF		1.83 REF		8, 9
B3	.006	.022	0.15	0.56	12
D	.280	.305	7.11	7.74	
D1	.150 BSC		3.81 BSC		
D2	.075 BSC		1.90 BSC		17
D3	---	.305	---	7.74	5
E	.480	.505	12.19	12.83	
E1	.200 BSC		5.08 BSC		
E2	.100 BSC		2.54 BSC		17
E3	---	.480	---	12.19	5
e	.050 BSC		0.38 BSC		
e1	.015	---	0.38	---	5, 13
h	.010 REF		0.25 REF		11
j	.010 REF		0.25 REF		11
L	.040	.055	1.14	1.40	
L1	.110	.120	2.79	3.05	19
L2	.120	.130	3.05	3.30	8, 9
L3	.003	.015	0.08	0.38	12
ND	4				6
NE	5				6
N	18				6

FIGURE 1. Case outline Y (18-terminal, .305" x .505"), rectangular chip carrier package - Continued.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

85152

REVISION LEVEL
D

SHEET
14

NOTES:

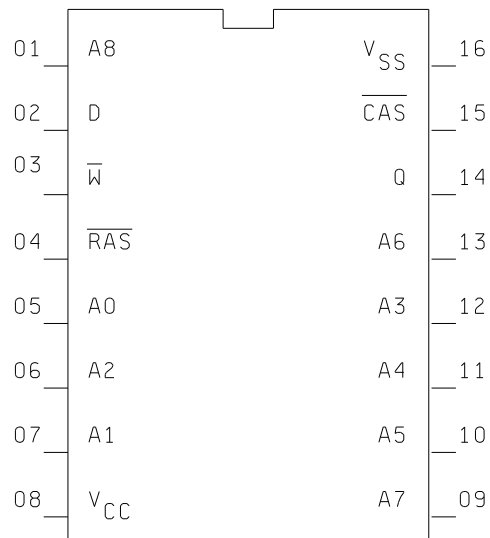
1. Dimensions are in inches.
2. Metric equivalents are for general information only.
3. To specify options in detail specification, see figure C-7 of MIL-M-38510.
4. Metallized castellations shall be connected to plane 1 terminals and extend toward plane 2 across at least two layers of ceramic or completely across all of the ceramic layers to make electrical connection with the optional plane 2 terminals (see 50.6 of MIL-M-38510).
5. Unless otherwise specified, a minimum clearance of .015 inch (0.38 mm) shall be maintained between all metallized features (e.g., lid, castellations, terminals, thermal pads, etc.).
6. Symbol "N" is the maximum number of terminals. Symbols "ND" and "NE" are the number of terminals along the sides of length "D" and "E" respectively.
7. The required plane 1 terminals and optional plane 2 terminals shall be electrically connected.
8. The index feature for terminal 1 identification, optical orientation or handling purposes, shall be within the shaded index areas shown on planes 1 and 2 (see 40.6.3 of MIL-M-38510). Plane 1 terminal 1 identification may be an extension of the length of the metallized terminal which shall not be wider than the B1 dimension. See note 9 for more details.
9. Plane 1 is the heat radiating surface. This surface may optionally be metallized with a checkerboard pattern of thermal conduction pads. The pad centerlines shall be aligned with the terminal centerlines. The number of pads in the pattern is determined by the following algorithm: $(ND - 2) \times (NE - 2)$ see note 6. When this option exists, the terminal 1 index feature may be additionally or alternately defined by deleting the thermal pad which is adjacent to terminal 1.
10. Dimension "A" controls the overall package thickness. When a window lid is used, dimension "A" must increase by a minimum of .010 inch (0.25 mm) and a maximum of .040 inch (1.02 mm).
11. The corner shape (square, notch, radius, etc.) may vary at the manufacturer's option, from that shown on the drawing.
12. See 50.6 and figure C-6 of MIL-M-38510. Dimensions "B3" minimum, "L3" minimum, and the appropriately derived castellation length define an unobstructed three dimensional space traversing all of the ceramic layers in which a castellation was designed. (Castellations are required on bottom two layers, optional on top ceramic layer.) Dimensions "B3" maximum and "L3" maximum define the maximum width and depth of the castellation at any point on its surface. Measurement of these dimensions may be made prior to solder dipping.
13. Corner metallization for terminals may have a .020 inch (0.51 mm) by 45° maximum chamfer to obtain the e1 dimension.
14. Chip carriers shall be constructed of a minimum of two ceramic layers.
15. The pad metallization, including annular ring, at the pad-to-package edge shall be within the virtual pad width established by true position dimensioning.
16. The tolerance is intended to limit package edge anomalies caused by material protrusions, such as rough ceramic, and misaligned ceramic layers.
17. When the number of terminals per side is even, datums F-G and -H- are located at the terminal array centers. When the number of terminals per side is odd, datums F-G and -H- are located at the centers of the center terminals.
18. See 40.2.3 of MIL-M-38510 for coplanarity measurement requirements.
19. Must be a dimensional difference of .020 inch (0.51 mm) between L1 and L2.

FIGURE 1. Case outline Y (18-terminal, .305" x .505"), rectangular chip carrier package - Continued.

<p>STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444</p>	<p>SIZE A</p>		<p>85152</p>
		<p>REVISION LEVEL D</p>	<p>SHEET 15</p>

Device types 01, 02, and 03

Case E



Device types 01, 02, and 03

Cases X and Y

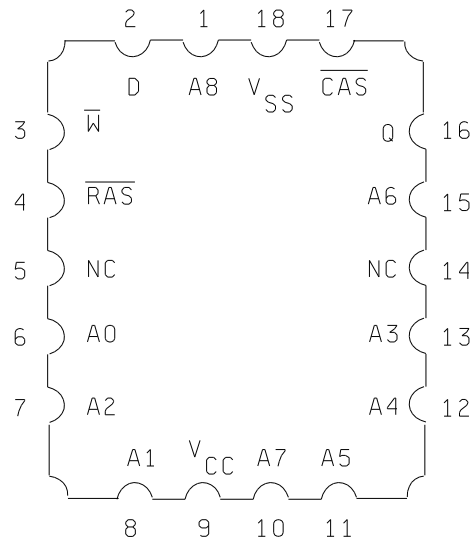


FIGURE 2. Terminal connections.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

85152

REVISION LEVEL
D

SHEET
16

Device types 01, 02, and 03

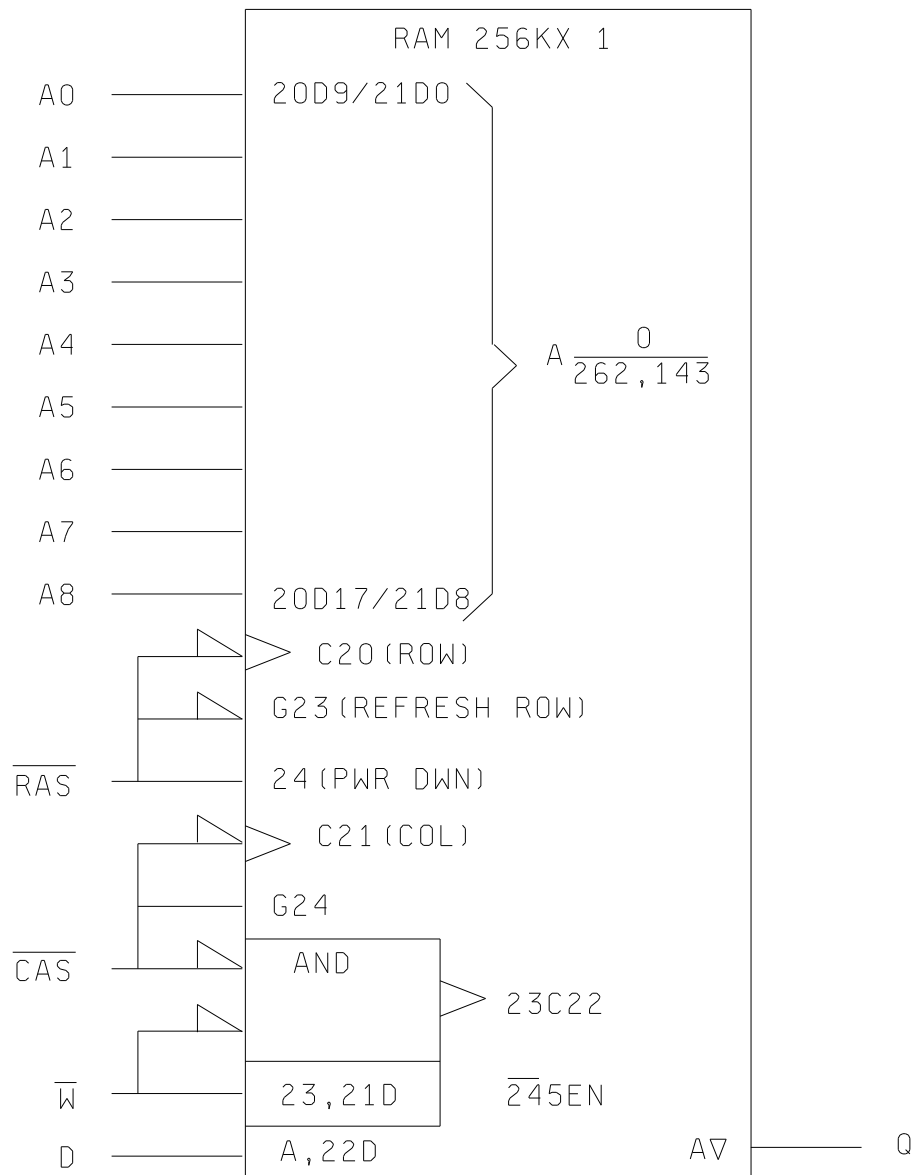


FIGURE 3. Logic diagram.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

85152

REVISION LEVEL
D

SHEET
17

Device types 01, 02, and 03

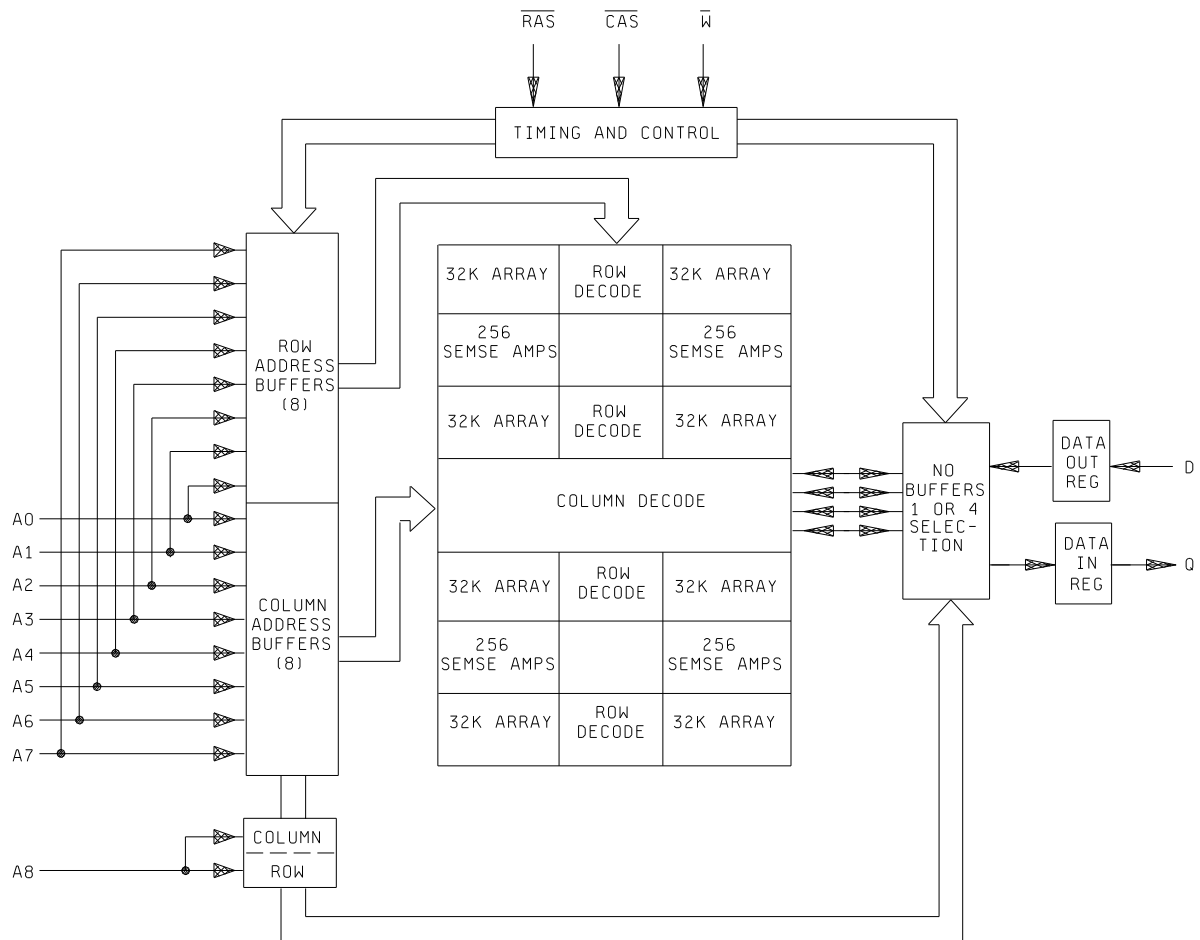


FIGURE 4. Block diagram.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

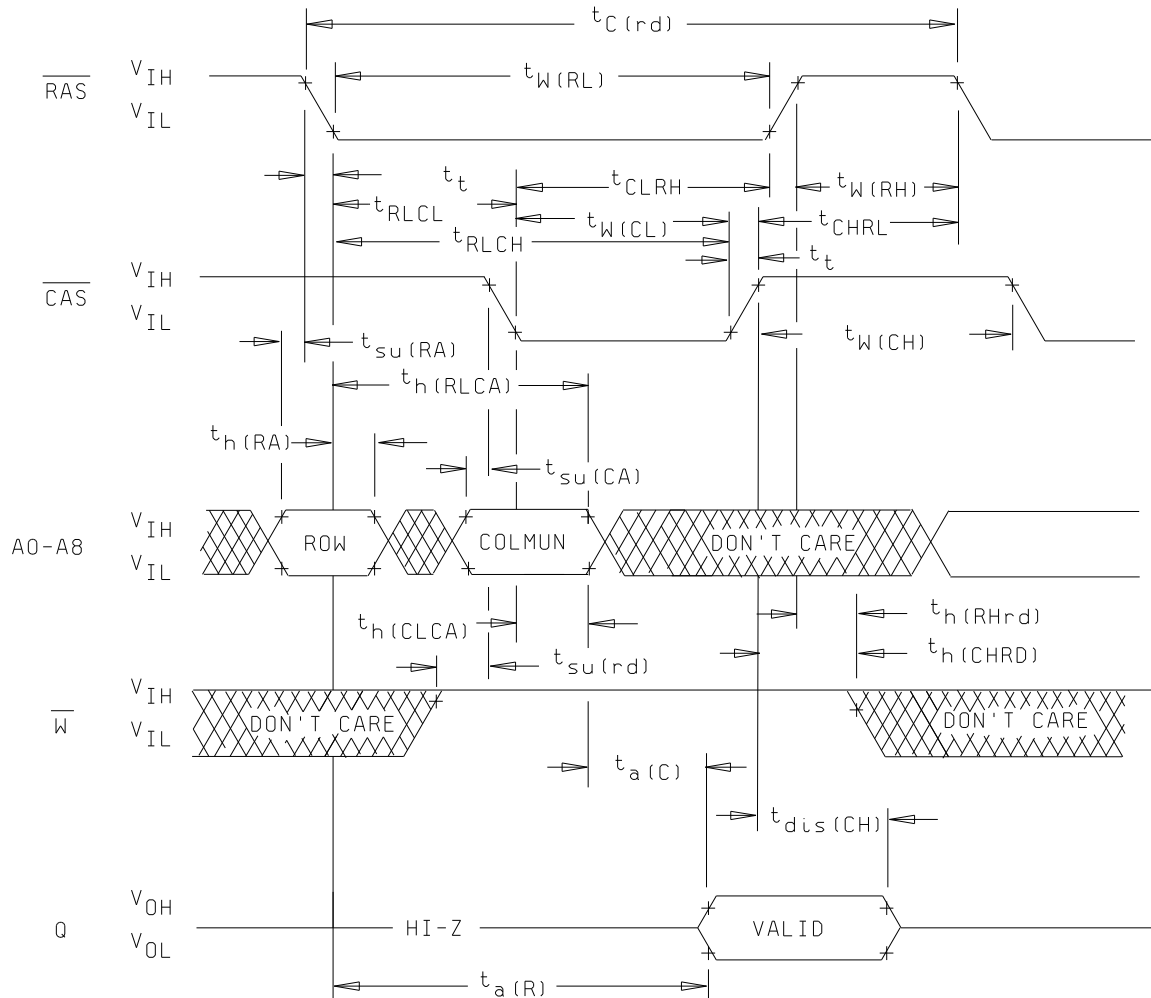
85152

REVISION LEVEL
D

SHEET
18

Read cycle timing

Device types 01, 02, and 03



NOTE: Outputs are referenced to: Hi-Z to active state, V_{OH} minimum or V_{OL} maximum; active state to Hi-Z, $V_{OH} - .5$ V or $V_{OL} + .5$ V.

FIGURE 5. Switching waveforms.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

85152

REVISION LEVEL
D

SHEET
19

Early cycle timing

Device types 01, 02, and 03

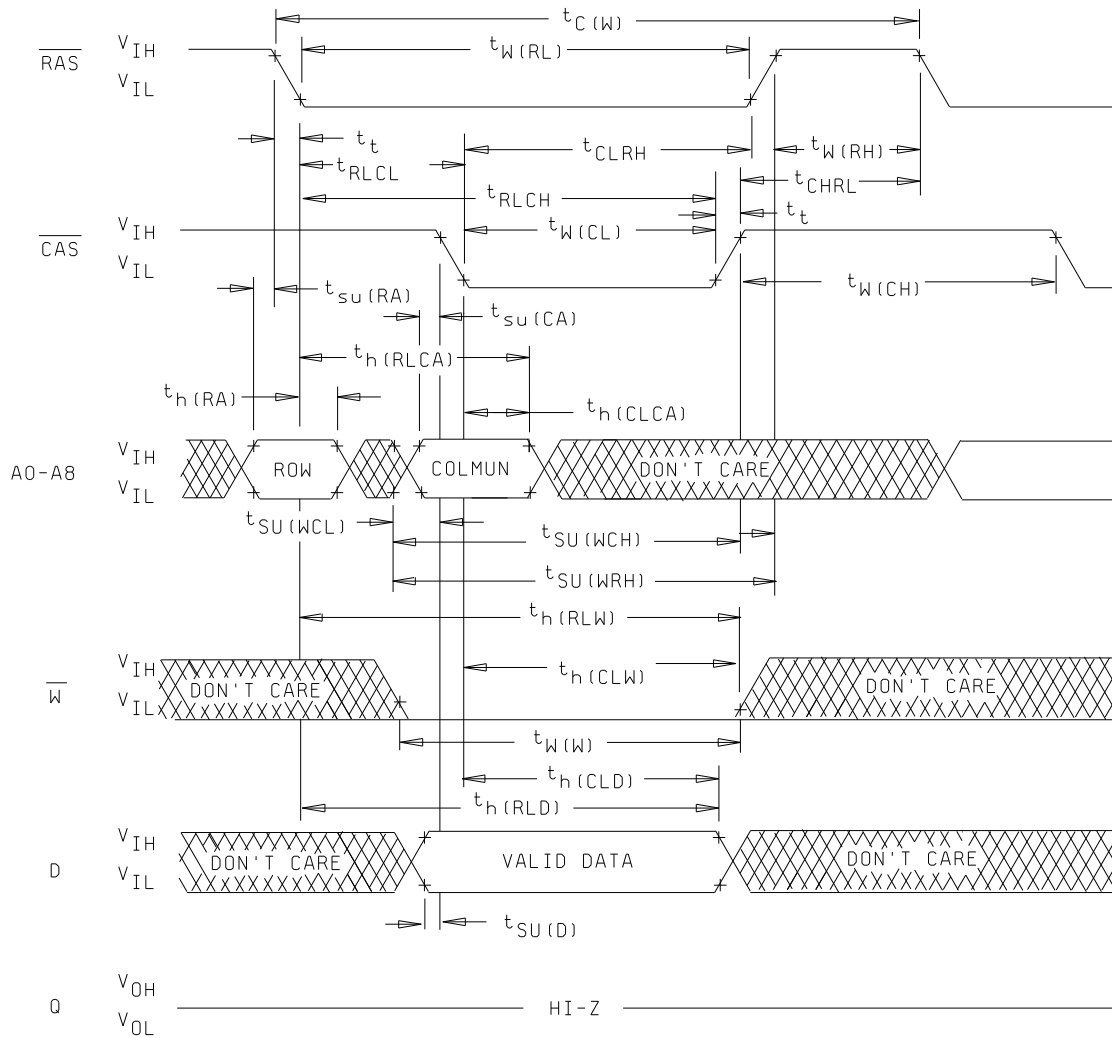


FIGURE 5. Switching waveforms - Continued.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

85152

REVISION LEVEL
D

SHEET
20

Device types 01, 02, and 03

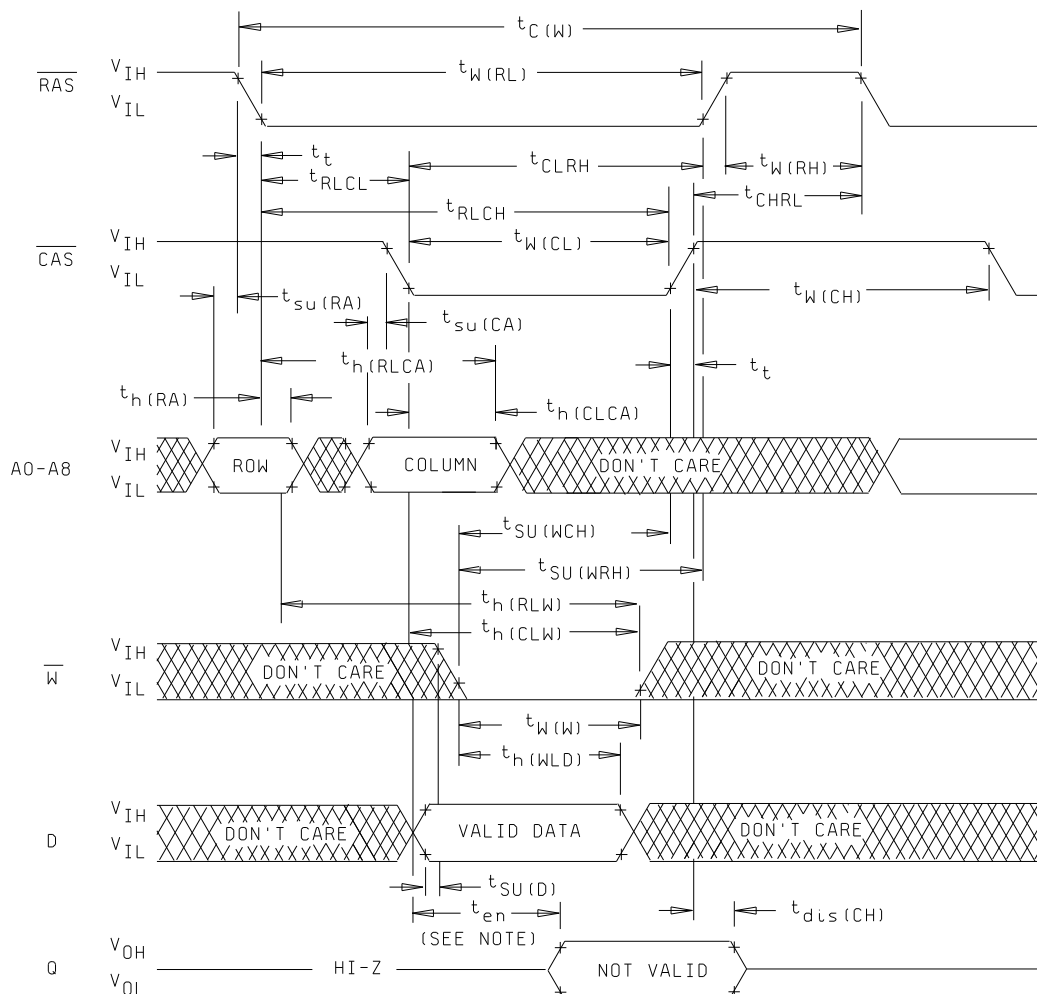


FIGURE 5. Switching waveforms - Continued.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		85152
		REVISION LEVEL D	SHEET 21

Read-write/read-modify-write cycle timing

Device types 01, 02, and 03

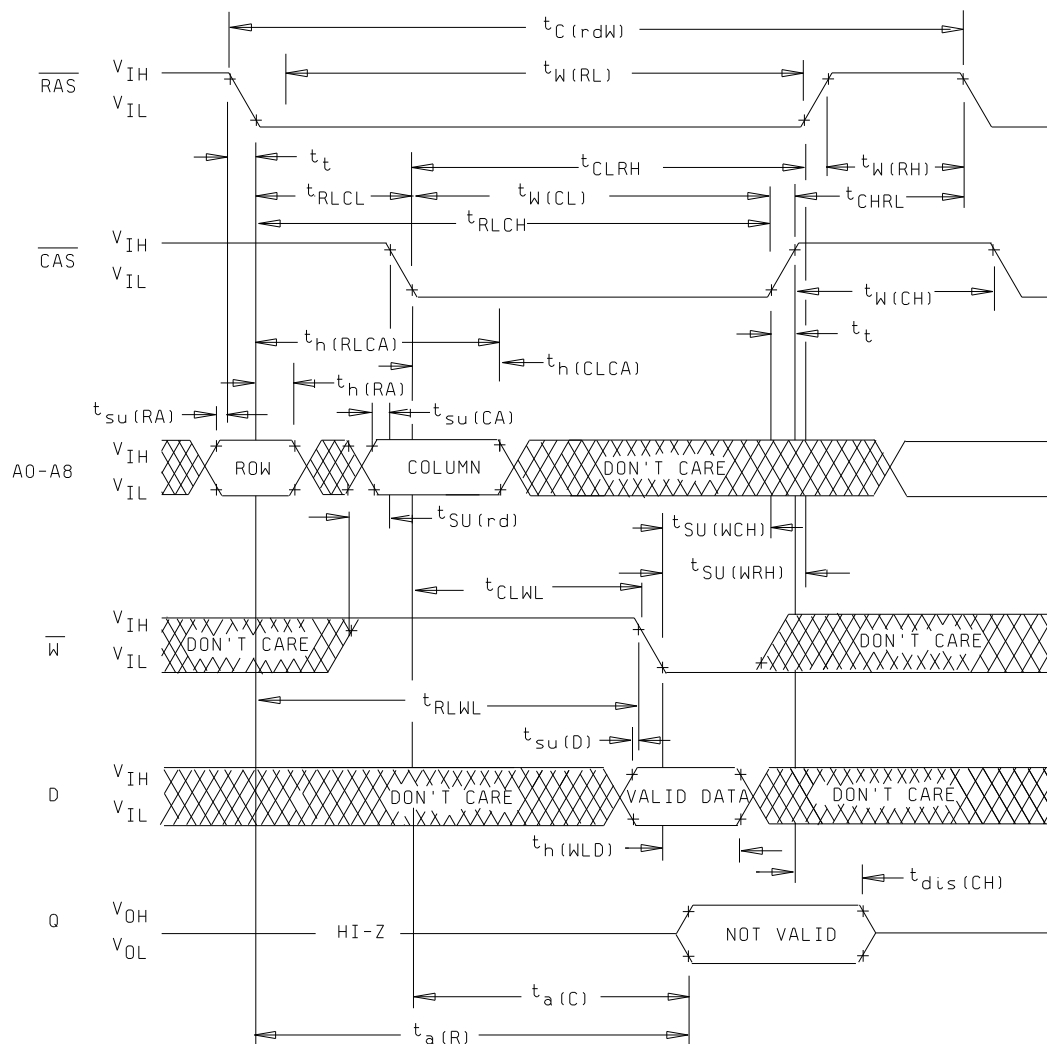


FIGURE 5. Switching waveforms - Continued.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

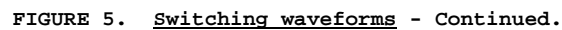
SIZE
A

85152

REVISION LEVEL
D

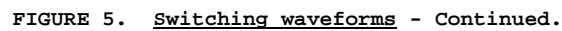
SHEET
22

Device types 01, 02, and 03



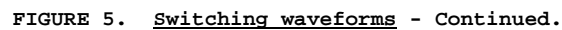
DESC FORM 193A
JUL 91

Device types 01, 02, and 03



SHEET
24

Device types 01, 02, and 03



SHEET
25

RAS-only refresh cycle timing

Device types 01, 02, and 03

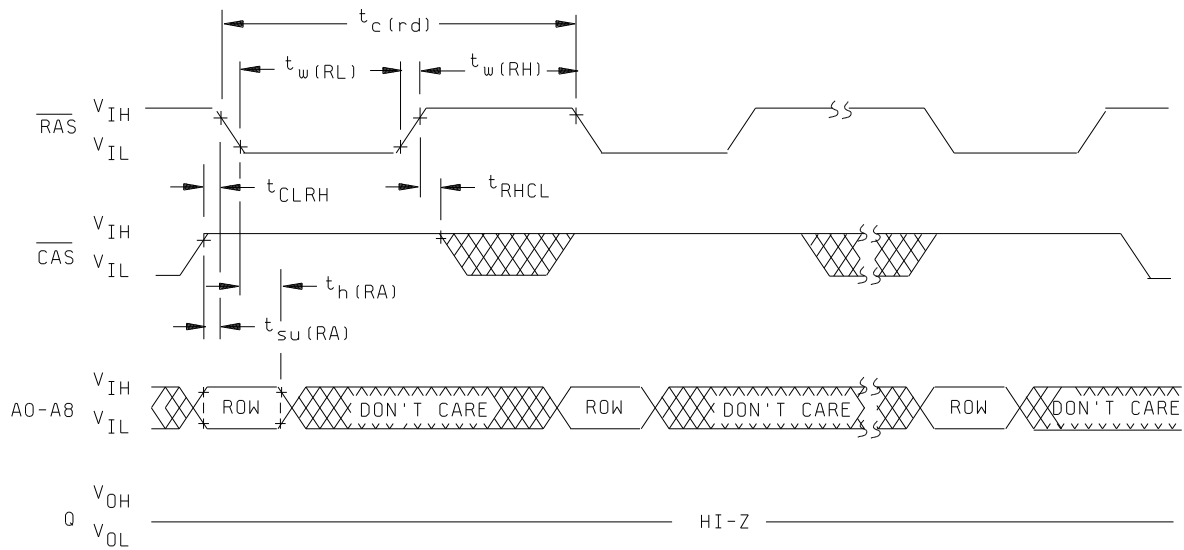


FIGURE 5. Switching waveforms - Continued.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

85152

REVISION LEVEL
D

SHEET
26

Hidden refresh cycle timing

Device types 01, 02, and 03

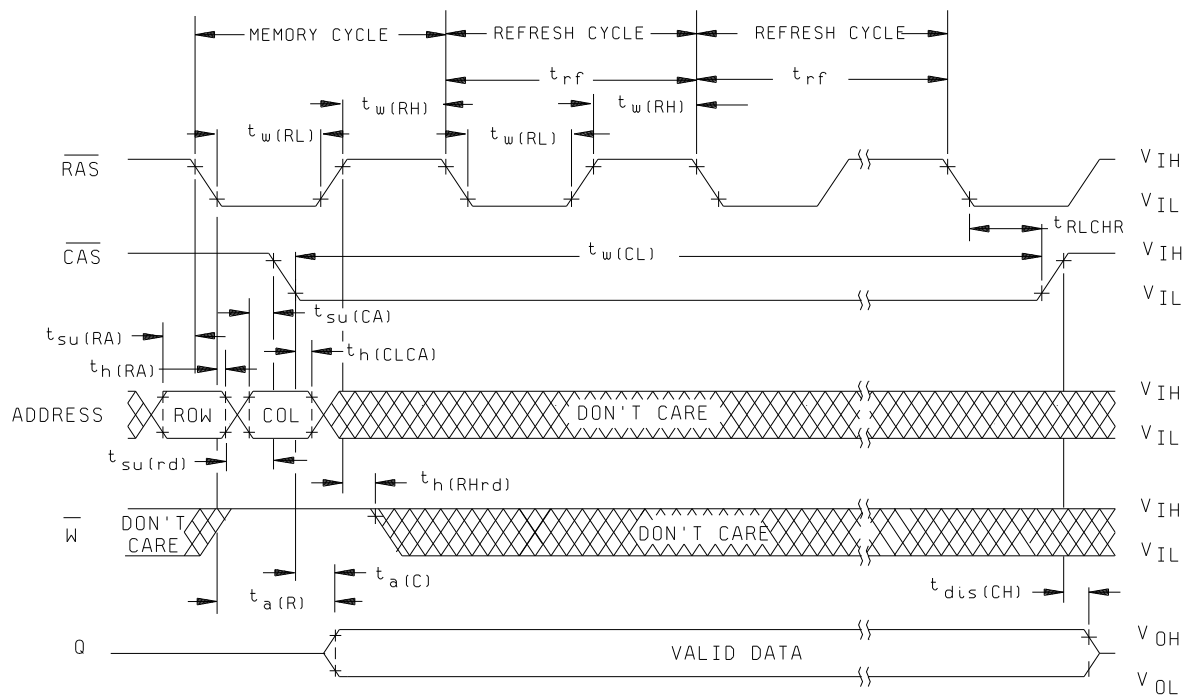


FIGURE 5. Switching waveforms - Continued.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

85152

REVISION LEVEL
D

SHEET
27

Automatic $\overline{\text{CAS}}$ - before $\overline{\text{RAS}}$ refresh cycle timing

Device types 01, 02, and 03

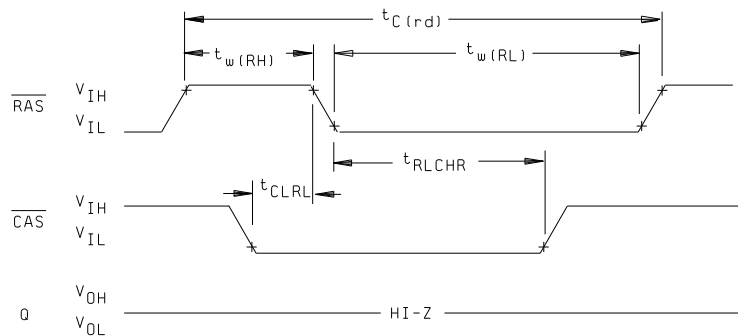


FIGURE 5. Switching waveforms - Continued.

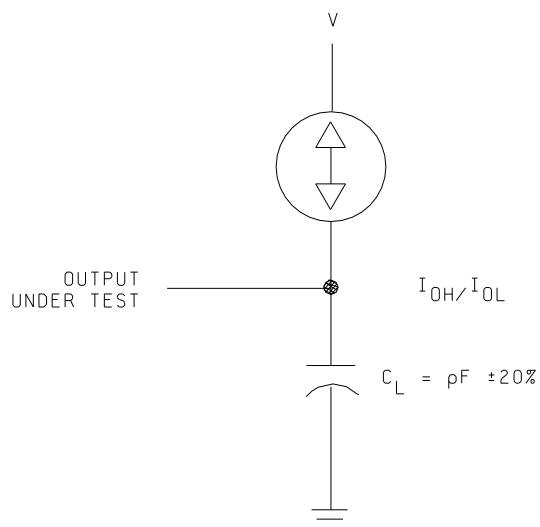


FIGURE 6. Load circuit.

STANDARDIZED
MILITARY DRAWING
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

SIZE
A

85152

REVISION LEVEL
D

SHEET
28

4.3.2 Groups C and D inspections.

- a. End-point electrical parameters shall be as specified in table II herein.
- b. Steady-state life test conditions, method 1005 of MIL-STD-883:
 - (1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.6 herein).
 - (2) $T_A = +125^{\circ}\text{C}$, minimum.
 - (3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-38510, the device specified herein will be inactivated and will not be used for new design. The QPL-38510 product shall be the preferred item for all applications.

6.2 Replaceability. Replaceability is determined as follows:

- a. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.
- b. When a QPL source is established, the device specified in this drawing will be replaced by the microcircuit identified as PIN M38510/2460XB*X.

6.3 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated with the users of record for the individual documents. This coordination will be accomplished in accordance with MIL-STD-481 using DD Form 1693, Engineering Change Proposal (Short Form).

6.4 Record of users. Military and industrial users shall inform the Defense Electronics Supply Center when a system application requires configuration control and the applicable SMD. DESC will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronic devices (FSC 5962) should contact DESC-ECS, telephone (513) 296-6047.

6.5 Comments. Comments on this drawing should be directed to DESC-ECS, Dayton, Ohio 45444, or telephone (513) 296-5377.

6.6 Approved sources of supply. Approved sources of supply are listed in MIL-BUL-103. The vendors listed in MIL-BUL-103 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DESC-ECS.

STANDARDIZED MILITARY DRAWING DEFENSE ELECTRONICS SUPPLY CENTER DAYTON, OHIO 45444	SIZE A		85152
		REVISION LEVEL D	SHEET 29

STANDARDIZED MILITARY DRAWING SOURCE APPROVAL BULLETIN

DATE: 92-07-27

Approved sources of supply for SMD 85152 are listed below for immediate acquisition only and shall be added to MIL-BUL-103 during the next revision. MIL-BUL-103 will be revised to include the addition or deletion of sources. The vendors listed below have agreed to this drawing and a certificate of compliance has been submitted to and accepted by DESC-ECS. This bulletin is superseded by the next dated revision of MIL-BUL-103.

Standardized military drawing PIN	Vendor CAGE number	Vendor <u>1</u> / similar PIN	Replacement military specification PIN
8515201EX	01295 6Y440 50088	SMJ4256-15JDS MT1259C-15 883C MKX45F56P-82	M38510/24604BEX
8515201XX	<u>2</u> / 6Y440	SMJ4256-15FVS MT1259EC-15 883	M38510/24604BXX
8515201YX	01295	SMJ4256-15FVS	
8515202EX	01295 6Y440 50088	SMJ4256-20JDS MT1259C-20 883C MKX45F56P-83	
8515202XX	<u>2</u> / 6Y440	SMJ4256-20FVS MT1259EC-20 883	
8515202YX	01295	SMJ4256-20FVS	
8515203EX	01295 50088 6Y440	SMJ4256-12JDS MKX45F56P-81 MT1259C-12 883C	M38510/24603BEX
8515203XX	<u>2</u> / 6Y440	SMJ4256-12FVS MT1259EC-12 883C	M38510/24603BXX
8515203YX	01295	SMJ4256-12FVS	

1/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.

2/ No longer available from approved source of supply.

Vendor CAGE
number

Vendor name
and address

01295

Texas Instruments, Incorporated
P.O. Box 6448
Midland, TX 79711

6Y440

Micron Technology, Incorporated
2805 East Columbia Road
Boise, ID 83706

50088

SGS-Thomson Microelectronics
1310 Electronics Drive
Carrollton, TX 75006

The information contained herein is disseminated for convenience only and the Government assumes no liability whatsoever for any inaccuracies in this information bulletin.